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1.—A NEW GENUS OF AUSTRALIAN ORCHID.

(With two Plates, I and II.)

by

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Rhizanthella, Rogers, n.gen.

Sepala et petala erecta, subaequilonga, in tubum fissum apice lobatum connata; sepalum dorsale cum dorso columnae et petalis plus minusve adnatum, latiusculum, concavum, apice incurvum; lateralia ad bases plus minusve connata, apicibus sinum includentibus. Petala sepalis leviter breviora et illis oblecta. Labellum ad apicem pedis columnae ungue tenui mobili affixum, conspicuum, indivisum, pro flore maximum. Columna erecta, teres, sepalis aequilonga, exalata, sepalo dorsali petalisque adnata, basi in pedem brevem producta. Anthera persistens, terminalis, bilocularis, valvata, erecta, vel leviter incumbens, margine posteriore clinandrii latiuscule affixa. Clinandrium subconcavum. Pollinia 4, granulosa, viscidio minuto rostellis subsessilia. Stigma majusculum, verticale, prominens. Rostellum erectum, emarginatum, anthera multo brevius.

Herbae terrestres, saprophyticae. Inflorescentiae in rhizomate ramoso incrassato subterraneo eradicato terminales. Flores parvuli, numerosi, in capitulo sessili multibracteato conferti.

Species singula adhuc nota, Australiae occidentalis incola.

R. Gardneri, Rogers, n. spec.

Herbae parviusculae, terrestres vel fortasse subterraneae, saprophyticae. Rhizomata brevia, incrassata, eradicantia, ramosa. Inflorescentiae erectae, sessiles, solitariae, terminales. Capitula ad 5 cm. in diametro; bractee ovatae vel oblongo-lanceolatae, majusculae, imbricatae, ad 5 cm. longae, apicibus leviter patentibus, circiter 12 in meis speciminibus. Flores

numerosi, parvuli, sessiles, atropurpurei, pluro-verticillati, adversi centrum, conferti. Sepala petalaeque erecta, circa 4 mm. longa, in tubum fissum apice 3-lobatum connata. Sepalum dorsale cucullatum, in dimidio inferiore cum dorso columnae petalisque adnatum, triangulari-ovatum, latiusculum, concavum, apice abrupte incurvum, apiculo brevi recurvo terminans; lateralia carnosae, dimidio inferiore connata, late triangularia, apicibus acutis brevibus sinum includentibus. Petala oblongo-falcata, acuta, membranacea, sepalis leviter breviora atque multo angustiora et illis obtecta; in dimidio inferiore sepalo dorsali galeam formantia. Labellum subrufum, ad apicem pedis columnae ungue tenui mobili affixum, conspicuum, pro flore maximum, linguiforme, apice subacuta, glandulosum, indivisum, carnosissimum, ad columnam erectum deinde recurvum; lamina longitudinaliter concava, apice ex galea paulo exserta. Columna erecta, sepalis fere aequilonga, exalata, teres, sepalo dorsali petalisque adnata, basi in pedem brevem producta. Anthera persistens, terminalis, erecta, vel leviter incumbens, emucronata, obtusiuscula, apice a latere compressa, margine posteriore clinandrii latiuscule affixa, bilocularis, valvata. Clinandrium subconcavum. Pollinia 4, granulosa, viscidio minuto rostellii subsessilia. Stigma majusculum, verticale, prominens, ovatum. Rostellum erectum, apice emarginatum, anthera multo brevius. Ovarium album, terete, gracile, ad 7 mm. longum, basibus adnatis; bractea lanceolata, ovario aequilonga vel longior.

Rather small terrestrial or possibly entirely subterranean saprophytic herbs. Rhizomes short, thickened, without roots, branching. Inflorescences erect, subsessile, solitary, terminal; those on the smaller lateral rhizomes with well developed bracteate stems. Capitula up to 5 cm. in diameter; bracts rather large, ovate or oblong-lanceolate, imbricate, up to 5 cm. long, slightly spreading at the apices, in my specimens about 12 in number. Flowers numerous, small, sessile, dark purple, crowded, facing the centre, arranged in 4 or 5 whorls. Sepals and petals erect, about 4 mm. long, connate in a split tube 3-lobed at the apex. Dorsal sepal cucullate, adnate in its lower half with the petals and back of the column, triangular-ovate, rather wide, concave, abruptly incurved at the apex, ending in a short recurved apiculum; lateral sepals very fleshy, connate in their lower half, widely triangular, their apices short acute enclosing a sinus. Petals oblong-falcate, acute, membranous, slightly shorter and much narrower than the sepals and hidden by the latter, adnate in the lower half by the posterior margins to the dorsal sepal and column, forming a galea with the former. Labellum reddish, attached to the apex of the column-foot by a delicate movable claw, linguiform, conspicuous, very large in comparison with the size of the flower, the apex subacute, glandular, undivided, very fleshy, erect against the column then recurved; lamina longitudinally concave, the tip slightly protruding from the galea. Column erect, almost equal in length to the sepals, not winged, terete, adnate to the petals and dorsal sepal, produced into a short foot at the base. Anther persistent, terminal, erect, without a point, rather obtuse, compressed laterally at the apex, rather widely attached to the posterior margin of the clinandrium, valvate, 2-celled. Clinandrium slightly concave. Pollinia 4, granular, almost sessile on the minute viscidium of the rostellum. Stigma prominent vertical, ovate, rather large. Rostellum erect, emarginate at the apex, much

shorter than the anther. Ovary white, terete, up to 7mm. long, the subtending bract lanceolate, equal to or sometimes longer than the ovary.

Western Australia. Corrigin, *John Trott*, 23.5.28; closely surrounding decayed stumps of *Melaleuca uncinata*, R.Br., on ploughed land, in symbiotic association with a fungus; Shackleton, *J. H. Plant*, June 1928. Goomalling, June 1928 (a small specimen).

These stations are situated in agricultural areas, the first two almost equidistant from the coast about 160 miles inland in an easterly direction. Shackleton is some 30 miles north of Corrigin. Goomalling lies nearer the coast and about 30 miles north of Northam. In each instance the orchid appears to have been turned up by the plough or cultivator. The first inflorescence was discovered in this way in virgin soil, the mallee and tea-tree on which had been rolled and burned this season. "Previous to rolling," says Mr. Trott, "the thicket was very dense and when burnt carried a fierce fire."

Mr. C. A. Gardner, Assistant Botanist to the Western Australian Government, to whom I am indebted for the material of this remarkable orchid and drawings of the underground plant, was kind enough to personally visit this locality and he has supplied me with the following field notes and observations:—

"The main or central rhizome is usually 12 inches deep in the soil and emits lateral spreading branches from near its base. It bears one large terminal bud, and the lateral branches have solitary terminal buds much smaller in size. These buds, which are formed about 10 inches below the surface, are well developed at this depth. The plant is without any visible roots, but the greater part of each rhizome is covered with thick-based hairs. The bud of the inflorescence was sessile at the summit of a thick rhizome in the largest plant seen. On the smaller lateral rhizomes there is a well developed stem, more or less slender and covered with scale leaves, all white and very brittle. At the base of some rhizomes there were seen some old withered ones, which would appear to indicate that the growing tubers are of annual duration. The living rhizomes are white. The inflorescence is always solitary and terminal, and it appears probable that the flowers are situated some little distance below the surface of the soil. There are two reasons for assuming this. The floral bracts are only coloured at the tips in the fresh 'flowers' and they deepen with exposure to light until quite half the bract is a purple colour. The second reason is the circumstance of the discovery. Mr. Trott, who is quite an observant man, was picking up sticks on the area on which the orchid was found about 7 days prior to the time the specimens were turned up by the cultivator. Had the bracts protruded any distance above the soil, he feels confident he would have seen them. The bracts of the first 'flower' seen (the first one I sent you) were erect, the tips slightly spreading and imbricate in a perfect cup. The country in which the orchid was seen is a common type in the wheat-growing areas of this State. The soil is a yellow sandy loam with a whitish hard subsoil of about 12 inches. This country carries dense thickets of *Eucalyptus cylindriflora*, Maiden and

Blakely, and *Melaleuca uncinata*, R.Br. The orchids were found closely surrounding the decayed stumps of the latter in all the examples observed. These stumps and roots were partially rotten through the action of a fungus, the mycelium of which formed dense masses of a violet colour and webby texture in the subsoil."

A superficial examination of the single capitulum which first reached me, suggested that it belonged to a member of the *Glomerinae*, a group of orchids chiefly restricted to the Malaysian and Papuan areas. Further examination, however, showed that there were tribal differences, and that like so many Australian orchids, the new plant was neottious in character. It had indeed distinct affinities with the *Gastrodiinae*, a subtribe in which it is now usual to include *Gastrodia*, R. Br.; *Didymoplexis*, Griff.; *Leucolena*, Ridl.; and *Auxopus*, Schltr. The first two genera are represented in our own flora, the others are respectively endemic to the Malay Peninsula and Cameroons. Of these four, it is undoubtedly most closely related to *Gastrodia*, R.Br. From this, however, it differs in the remarkable inflorescence of numerous sessile flowers, united by their ovaries and crowded together in a bracteate capitulum; also in its unwinged column, and in its stigma which is situated on the face of the column near the apex, and not at the base as in *Gastrodia*, and likewise by its slenderly clawed, very movable and exceedingly fleshy labellum. Some of these differences appear to be of sufficient importance to warrant its exclusion from the *Gastrodiinae*.

I must therefore regard it as the type of a new sub-tribe, belonging to the *Polychondreae*, which I characterise as follows:—

Rhizanthellinae, n.subtr.

Plantae saprophyticae. Innovationes e rhizomate brevi incrassata plus minusve horizontali. Folia exarticulata vel deficientia. Inflorescentiae terminales. Flores sessiles, in capitulo bracteato conferti. Sepala et petala plus minusve connata.

This new sub-tribe should be placed next to *Gastrodiinae*, in the latest (1926) Schlechterian system.¹

By no means the least interesting observation contained in Mr. Gardner's field notes quoted above, is that which refers to the development of a more or less leafy scape from the smaller of the lateral rhizomes. This is illustrated in Plate II., fig. D, where it will be noted that even at this early stage the shoot already bears a small capitulum at its apex. It would be interesting to know what becomes of such shoots in the life-history of the plant. May it be assumed that the stems undergo the usual rhizomal thickening and that the inflorescence reaches maturity? Or are they ancestral rudimentary structures which drop off at an early stage? In his investigation of the symbiotic relationship between *Gastrodia elata* and *Armillaria mellea*, Kusano found that only the large tubers became infected by the fungus and that they alone flowered; and further that the younger ones only continued to grow so long as they remained attached to the parent tuber.

The material of this plant so far discovered has been more or less fragmentary or damaged. A mature capitulum for instance has not actually been seen *in situ* on the rhizome, nevertheless there appears to be sufficient evidence to warrant the belief that the plant leads a complete or almost complete subterranean existence.

The records, as shown by the material available, indicate extreme stress of environment followed by the most abject plant poverty and degradation.

(I am indebted for the execution of Plate I. to Mr. W. H. Nicholls, of Melbourne).

EXPLANATION OF PLATES.

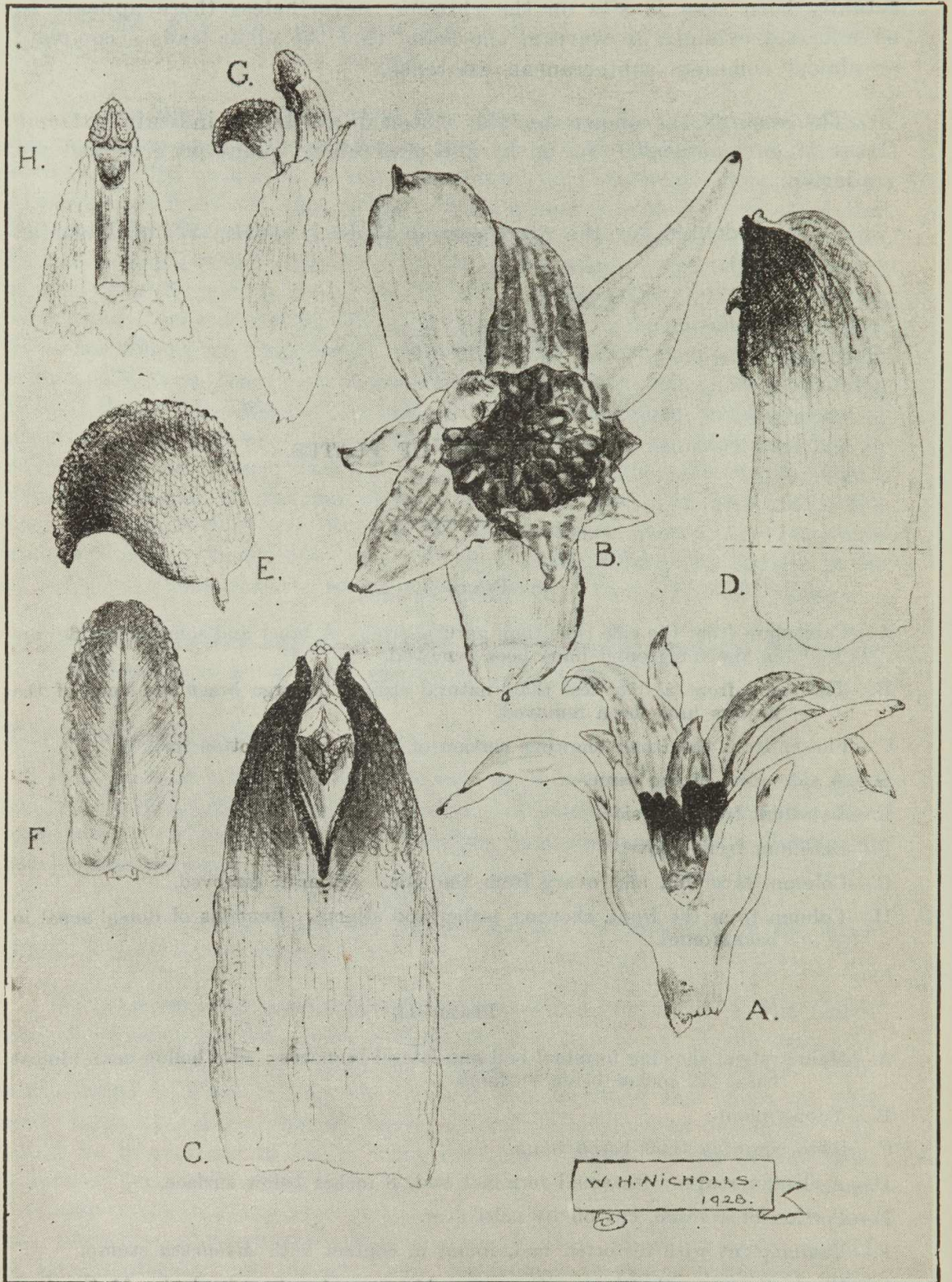
PLATE I.

- A.—Capitulum from the side (less than natural size). A bract and some of the flowers in the foreground have been removed.
- B.—The same from above (less than natural size). A large bract and some of the flowers have been removed.
- C.—Flower from the front, showing portion of ovary below dotted line.
- D.—A side view of the same.
- E.—Labellum from the side.
- F.—Labellum from above.
- G.—Column, labellum, and ovary from the side. Perianth removed.
- H.—Column from the front, showing anther and stigma. Remains of dorsal sepal in background.

PLATE II.

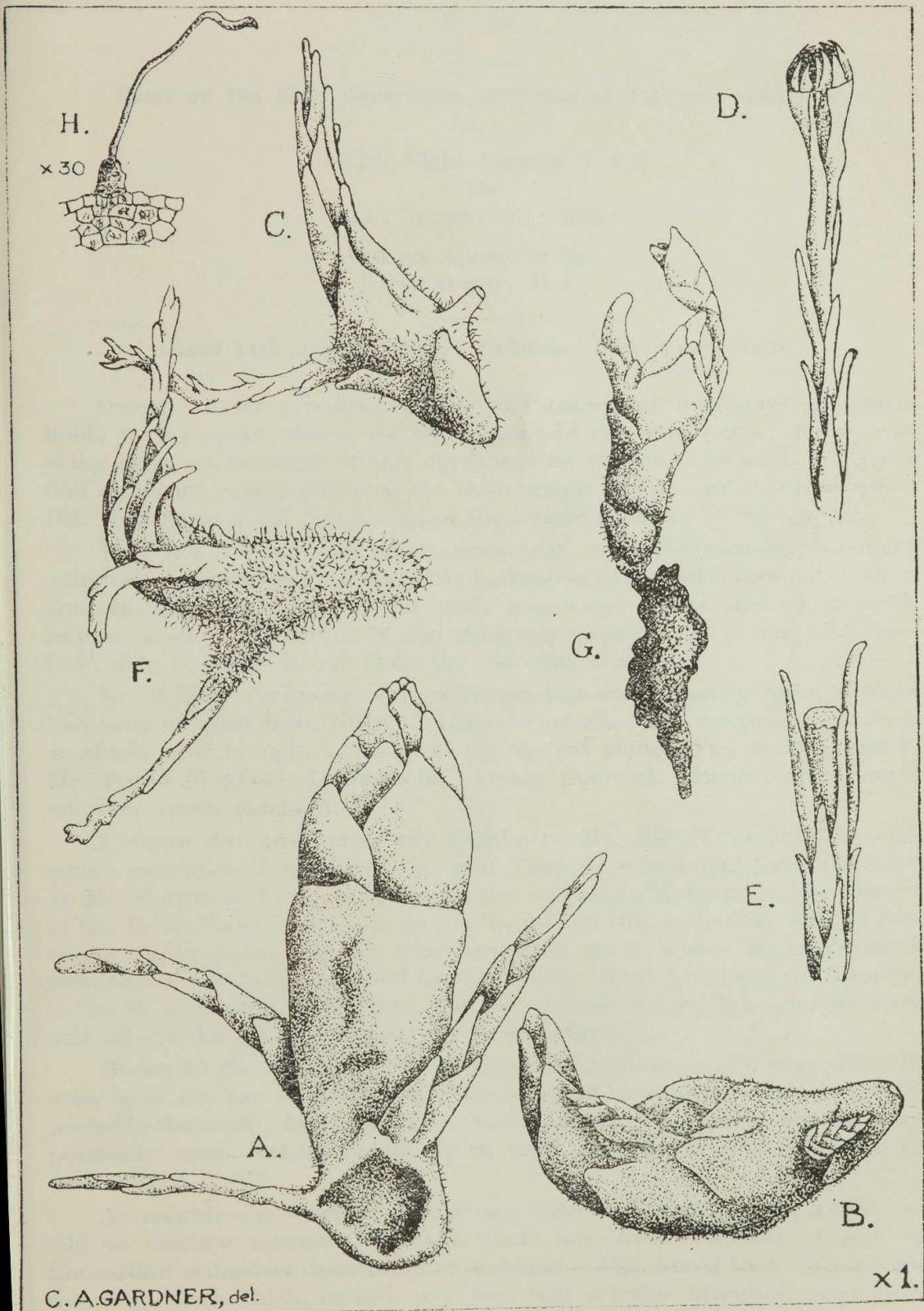
- A.—Main system, showing terminal bud and lateral branches; also hollow scar, almost basal (12 inches below surface).
- B.—Young plant.
- C.—Ditto, showing thick-based hairs.
- D.—A slender scape, with small terminal bud, 8 inches below surface.
- E.—Portion of a scape, cut off by cultivator.
- F.—Young plant with distorted bud, found in contact with *Melaleuca* stump.
- G.—Illustrating growth (the position was oblique, not perpendicular). At the base is a mummified rhizome, the middle article represents a stem with terminal bud and two lateral young rhizomes. Depth about 10 inches.
- H.—A hair from the rhizome $\times 30$. — (A — G, natural size).

PLATE I.



Rhizanthella Gardneri, Rogers.

PLATE II.



Rhizanthella Gardneri, Rogers.